Objectives: To compare the outcomes of surgeon-modified fenestrated-branched stent grafts (*m*FBSG) and abdominal debranching (AD) in patients unfit for conventional open repair of complex abdominal (AAA) and thoracoabdominal aortic aneurysms (TAAA).

Methods: We reviewed the outcomes of 35 high-risk patients (30 male, 5 female; median age 75 years) treated for large (7.2±1 cm) complex AAA and TAAA between 2006 and 2008. Fifteen patients had AD of 43 vessels (26 mesenteric, 17 renal) with aortic stent grafting. Twenty patients had 1 to 4-vessel *m*FBSG with branch artery stenting of 52 vessels (32 renal, 18 mesenteric, 2 hypogastric). End-points were mortality, morbidity, patency, endoleak and re-intervention rates.

Results: *m*FBSG patients had higher comorbidity scores (16±5 vs 12±3; P<.03) and more (P<.05) stress-induced cardiac ischemia (60% vs 27%), renal insufficiency (65% vs 20%) and trans-renal aneurysm extension (100% vs 67%). The number of target vessels per patient (2.8±1) was similar in both groups, but AD patients had more thoracic extension (80% vs 32%; P<.05). Technical success for branch artery stenting was 98% (51/52). *m*FBSG required more (P<.05) fluoroscopy time (+135±20 min) and contrast dose (+105±89 ml), but less operative time (−151±49 min), blood loss (−1±0.8 L) and fluid requirement (−7±2 L). There was 1 (5%) operative death after *m*FBSG and 3 (20%) after AD (P=0.19). Patients treated with *m*FBSG had less complications (40% vs 73%; P<.05), similar paraplegia rate (5% vs 13%; P=.39) and decreased hospital stay (−10±7 days; P<.05). Type I endoleak was noted in 3 *m*FBSG (2 resolved) and in 4 AD patients (1 resolved). There was no difference in 1-year freedom from endoleak (83±9% vs 74±9%), re-intervention (83±9% vs 58±9%), target vessel patency (95±9% vs 98±2%) and survival (72±8% vs 71±9%) in *m*FBSG vs AD patients. Sac shrinkage (> 5mm) was noted in 7 of 9 (78%) *m*FBSG patients with >6 months follow up, and in none of the AD patients (P<.02). There were no migrations, component separations, fractures, or aneurysm ruptures after *m*FBSG.

Conclusion: Surgeon-modified fenestrated and branched stent grafts can be performed with high procedural success in high-risk patients with complex AAA and TAAA. This study supports the use of *m*FBSG as an alternative to AD in patients who are suitable candidates for both techniques.

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RR12.

Changes in AAA Neck Morphology and Loss of Anatomic Suitability for EVAR during Surveillance: Does the "Window of Opportunity" Close for Some Small AAAs?

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Background: Growth of small abdominal aortic aneurysms (AAAs) is frequently associated with aortic neck and iliac artery (IA) changes during surveillance. The purpose of this study was to determine the effects of aortic neck and IA changes on anatomic suitability for endovascular aortic aneurysm repair (EVAR) during long-term follow-up, particularly of small AAAs with marginal neck morphology (length < 15 mm and diameter >28 mm).

Methods: We studied 62 patients with small AAAs (diameter, 4 cm to 5.4 cm) under surveillance with long-term follow-up by CT angiography and 3D reconstructions. The mean follow-up duration was 36 months (interquartile range [IQR], 16-53 months). AAA morphology and changes were measured according to SVS reporting standards. Suitability for EVAR was determined by neck anatomy (diameter, length and angulations, thrombosis), IA morphology and all AAA angulations.

Results: The median age of the study cohort was 74 years (IQR, 65-77 years). Marginal necks were present in 22 (35%) small AAAs on initial CTA. Of these AAAs with marginal necks, 74% were considered suitable for EVAR. The median AAA diameter increased from 44.5 mm (IQR, 41-48) to 51.1 mm (IQR, 46-55). The aortic neck diameter increased from 23.0 mm to 25.9 mm (*P*=.001), whereas neck length decreased from 26.5 mm to 19.0 mm (*P*<.001). No significant changes in aortic and IA morphology/angulation occurred. Overall, the anatomic suitability for endovascular repair significantly changed during the study period (81% vs 69%; McNemar test, *P*<.001). Of note, 45% of AAAs with marginal neck morphology vs. 3% of those with adequate necks were not suitable for EVAR at the end of follow-up (*P*<.001). In fact, AAAs with marginal necks had a 17-fold increased risk of losing anatomic suitability for EVAR during surveillance (odds ratio, 16.8; 95% confidence interval, 4.0-69).

Conclusions: Significant changes in aortic neck morphology and EVAR suitability occur during long-term surveillance of small AAAs. EVAR suitability is primarily affected in small AAAs with marginal neck morphology. Our data indicate that early elective EVAR for small AAAs with marginal necks is justified when this is the preferred treatment option, as ongoing surveillance in such patients may result in aortic neck changes that preclude future EVAR.

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RR13.

Outside the IFU: Do Results Justify Aggressive EVAR Deployment in Short Angled Aortic Necks?

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Objective: Widespread community adoption of EVAR has led to changing referral patterns to academic centers, now consisting of more patients with unsuitable anatomy defined in the instructions for use (IFU) of endografts. Treatment of AAAs with high-risk anatomy (neck length<15mm, neck angle >60°) using commercially available devices has become more common with increasing institutional experience. We examined whether placement of approved devices in short angled necks provides acceptable durability at early and intermediate time points.

Methods: 218 patients (197 men, 21 women) underwent elective EVAR at a single academic center from 2004-2007 with at least 1 year follow-up. All available pre- and post-op imaging and clinical follow-up were reviewed. Patients were divided into suitable anatomy (IFU) and high-risk (non-IFU) categories.

Results: IFU (n=143) patients underwent repair with Excluder (40%), AneuRx (34%), and Zenith (26%) devices, while non-IFU (n=75) were treated primarily with Zenith (57%). Demographics between the groups were similar, and anatomic details are in Table 1. Operative mortality was 1.4% and morbidity was 11.9%, with mean follow-up of 24 months (range 1-60). Non-IFU patients tended to have larger sac diameters, shorter, conical, and more angled necks, and were more likely to require suprarenal fixation, placement of proximal cuffs, and increased fluoroscopy time. There were no early or late surgical conversions. Rates of migration, endoleak, need for 2nd procedures, sac regression, and freedom from aneurysm-related death were similar between the groups.

Conclusions: EVAR can be performed safely in high-risk patients with unfavorable neck anatomy using commercially-available endografts. Suprarenal fixation and proximal cuffs are often required for optimal results. Mid-term outcomes are comparable to those achieved in patients with suitable anatomy using the same devices. Long-term follow-up will continue to be necessary to confirm the benefit of treating these high-risk patients.

Preoperative AAA measurements	*Total (n=218)*	*IFU (n=143)*	*Non-IFU (n=75)*	*P-value*
AAA max diameter (mm)	58.5	56.9	61.5	.002
Neck length (mm)	24	25	13	<.0001
% Neck length < 10mm	10.6%	0%	30.7%	<.0001
% Conical necks	33.5%	25.2%	49.3%	<.0001
Neck angulation (deg)	30	15	59	<.0001
% Neck angle >60 deg	23.8%	0.7%	68%	<.0001
Associated iliac aneurysm	24.8%	25.9%	22.7%	NS
Procedural characteristics				
% Suprarenal fixation use	37.2%	26.6%	57.3%	<.0001
% Proximal cuff use	6.0%	2.1%	13.3%	.003
Estimated blood loss (mL)	357	347	377	NS
Fluoroscopy time (min)	27.1	24.7	31.3	.02
Contrast use (mL)	118	118	119	NS
Mid-term Outcomes				
% Migration>10mm	2.3%	2.1%	2.7%	NS
% Type I endoleak	5.5%	5.6%	5.3%	NS
% Type II endoleak	37.6%	41.3%	30.7%	NS
% 2nd procedure	16.5%	17.5%	14.7%	NS
Mean sac regression (mm)	−5.1	−4.9	−5.5	NS
Kaplan-Meier Estimates				
Freedom from aneurysm-related death	2-year	97.1%	98.5%	NS
	3-year	97.1%	98.5%	NS
Overall survival	2-year	84.8%	88.2%	NS
	3-year	81.6 %	77.9%	NS

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